The interacting boson model (IBM-1) is used to calculate the energy levels, transition probabilities \( B(E2) \), and potential energy surfaces of some even \(^{120-126}Xe\) isotopes. The theoretical values are in good agreement with the experimental data. The potential energy surface is one of the nucleus properties, and it gives a final shape of nuclei. The contour plot of the potential energy surfaces shows that the \(^{120-126}Xe\) nuclei are deformed and have \( \gamma \)-unstable-like characters.

**Keywords**: IBM-1, energy levels, \( B(E2) \) values, potential energy surface, Xe isotopes.

1. Introduction

The interacting boson model represents an important step to understand the nuclear structure. It introduces a simple Hamiltonian capable of describing collective nuclear properties through an extensive range of nuclei, and it is based on somewhat general algebraic group theoretical methods [1, 2]. The interacting boson model-1 (IBM-1) is a valuable interactive model developed by Iachello and Arima [3, 4]. It has been efficient in describing the collective nuclear structure of the medium-mass nuclei, low-lying states, and electromagnetic transition rates. The interacting boson model defines the six-dimensional space and is described by in terms of the unitary group \( U(6) \).

There are three dynamical symmetry limits of \( U(6) \) known as a spherical vibrator, symmetric rotor, and \( \gamma \)-unstable rotor which are labeled by \( U(5) \), \( SU(3) \), and \( O(6) \), respectively [5, 6]. Xenon isotopes belong to a very exciting, but complex region of the Periodic table known as the transition region. The xenon isotopes can exhibit the excitation spectra close to the \( O(6) \) symmetry. Xenon isotopes are in a typical transition region of nuclei, in which the nuclear structure varies from that of a spherical nucleus to a deformed nucleus [7]. For the xenon series of isotopes, the original version of IBM-1 had been used in calculating the energy levels of the positive parity low-lying nuclei [8]. For the even \(^{120-126}Xe\) isotopes with neutron number \((66 \leq N \leq 72)\), the energy ratio \((E4^+ / E2^+)\) is nearly 2.5 and indicates \( \gamma \)-soft shapes. In the recent years, many works had been done on the structure of xenon isotopes; S.A. Eid and S.M. Diab [9] calculated the potential energy surfaces, \((V/\beta, \gamma)\) for a series of xenon isotopes \(^{122-134}Xe\), energy levels, and reduced transition probabilities \( B(E2) \), by using IBM-1. These results were compared with the experimental data and found sensible agreement. K. Pomorski and B. Nerlo-Pomorska [10] studied the quick rotation for the even-even Zn, Mo, Sn, Te, Xe, Ba, Ce, and Nd isotopes and presented the typical properties for high-spin states as well. B.S. Rawat and P.K. Chattopadhyay [11] analyzed the spectra of the xenon isotopes by the \( O(6) \) symmetry breaking and used the excitation energies of the states \( 0^+_2 \) and \( 0^+_3 \) under a noticeable breaking of the symmetry. H. Kusakari and M. Sugawara [12] calculated the energy levels, backbendings in the yrast bands, and reduced transition probabilities for the positive-parity states of \(^{122-130}Xe\) within the framework of the interacting boson model. B. Saha et al. [13] measured the \( B(E2) \) and \( B(M1) \) values for the isotope of \(^{124}Xe\). H. Kusakari et al. [14] studied the high-spin states in the even \(^{122-130}Xe\) by in-beam \( \gamma \)-ray spectroscopy. The \( 10^+_2 \) level in \(^{126}Xe\) was assigned...
near the 10^7 level, and the 14^7 level was too. In the yrast bands, the backbending phenomena were detected systematically in the even 122–130Xe isotopes. L. Coquard et al. [15] investigated low-lying collective states in 126Xe via the 12C(126Xe, 126Xe*) projectile Coulomb excitation reaction at 390 MeV. M. Serris et al. [16] used the EUROGAM array to investigate the high-spin states in 126Xe by γ–γ coincidence measurements. The reaction 96Zr (30Si, 4n) 124Xe was used to populate states of 126Xe at a beam energy of 135 MeV. The new structures of competing B(M1) to B(E2) transitions were observed. In the O(6)-like nuclei, the triaxial deformation of the even-even Xe, Ba, Ce isotopes had been studied.

The aim of the present work is to study the energy levels, transition probabilities B(E2), and the potential energy surfaces of some even 120–126Xe isotopes within the framework of IBM-1 and to compare the results with the experimental data. Furthermore, we will describe the nuclear structure for Xe isotopes, by using the potential energy surface E(N, β, γ).

2. Interacting Boson Model (IBM-1)

The Interacting Boson Model has become one of the most intensively used nuclear models, due to its ability to describe the changing low-lying collective properties of nuclei across the entire major shell with a simple Hamiltonian. In IBM-1, the low-lying collective properties of even-even nuclei were described in terms of a system of interacting s-bosons (L = 0) and d-bosons (L = 2) [18]. The underlying structure of the six-dimensional unitary group U(6) of the model leads to a simple Hamiltonian capable of describing the three dynamical symmetries U(5), SU(3), and O(6) [4, 18]. The most general IBM Hamiltonian can be expressed as [19, 20]:

\[
H = \varepsilon_s (s^\dagger \cdot s) + \varepsilon_d (d^\dagger \cdot d) + \sum_{L=0,2,4} \frac{1}{2}(2L+1)^{1/2}C_L \times
\]

\[
\times [d^\dagger \times d^\dagger]^{(L)} [d \times d]^{(L)}\right)^{(0)} + \frac{1}{\sqrt{2}}v_2 [d^\dagger \times d^\dagger]^{(2)}\times
\]

\[
\times [\tilde{s} \times \tilde{s}]^{(2)} + [d^\dagger \times s^\dagger]^{(2)} \times [\tilde{d} \times \tilde{d}]^{(2)}\right)^{(0)} +
\]

\[
+ \frac{1}{2}v_0 \left[ [d^\dagger \times d^\dagger]^{(0)} \times \tilde{s} \times \tilde{s} \right]^{(0)} + [s^\dagger \times s^\dagger]^{(0)} \times
\]

\[
\times \tilde{d} \times \tilde{d} \right)^{(0)} + \frac{1}{2}u_0 \left[ [s^\dagger \times s^\dagger]^{(0)} \times \tilde{s} \times \tilde{s} \right]^{(0)} +
\]

\[
+ u_2 \left[ [d^\dagger \times s^\dagger]^{(2)} \times [\tilde{d} \times \tilde{s}]^{(2)} \right]^{(0)},
\]

where \((s^\dagger, d^\dagger)\) and \((\tilde{s}, \tilde{d})\) are the creation and annihilation operators for s- and d-bosons, respectively [18]. This Hamiltonian contains two one-body terms specified by the parameters \((\varepsilon_s, \varepsilon_d)\) and seven two-body terms specified by the parameters \(C_L\) \(L = 0, 2, 4\), \(v_L\) \((L = 0, 2)\), \(u_L\) \((L = 0, 2)\), where \(\varepsilon_s\) and \(\varepsilon_d\) are the single-boson energies, and \(c_L, v_L\) and \(u_L\) describe the two-boson interactions. However, it turns out that, for a fixed boson number N, only one of the one-body terms and five of the two-body terms are independent, as it can be seen by noting \(N = n_s + n_d\). There are several corresponding ways to write the Hamiltonian, one of these forms is the multipole expansion [18, 19, 20]:

\[
H = \varepsilon_{n_d} + a_0 \rho \rho + a_1 L \cdot \tilde{L} + a_2 Q \cdot \tilde{Q} + a_3 \tilde{T}_3 + a_4 \tilde{T}_4 \cdot \tilde{T}_4.
\]

(2)

The operators are defined by the following equations:

\[
\tilde{n}_d = (d^\dagger \cdot \tilde{d}),
\]

\[
\rho = 1/2 \tilde{d} \cdot \tilde{d} - \tilde{s} \cdot \tilde{s},
\]

\[
L = \sqrt{10} \tilde{d} \times \tilde{d},
\]

\[
\tilde{Q} = [d^\dagger \times \tilde{s} + s^\dagger \times \tilde{d}]^{(2)} + \chi [d^\dagger \times \tilde{d}]^{(2)}\]

\[
\tilde{T}_r = [d^\dagger \times \tilde{d}]^{(r)}
\]

(3)

(4)

(5)

(6)

(7)

(8)

where \(\tilde{n}_d\), \(\rho\), \(L\), \(\tilde{Q}\), and \(\tilde{T}_r\) are the total number of d-bosons, pairing, angular momentum operator, quadrupole, octupole \((r = 3)\), and hexadecapole \((r = 4)\) operators, respectively, \(\varepsilon\) is the boson energy, and \(\chi\) (CHI) is the quadrupole structure parameter, which takes the values 0 and \(\pm \frac{\sqrt{5}}{2}\) [18, 19, 20]. The parameters \(a_0, a_1, a_2, a_3,\) and \(a_4\) designate the pairing strength, angular momentum, quadrupole, octupole, and hexadecapole interactions between the bosons. The O(6) symmetry of IBM-1 is based on the chain \(U(6) \supset O(6) \supset O(5) \supset O(3)\) of the nested subalgebra with quantum numbers \(N, \sigma,\) and \(L\), respectively [18]. The energies of collective states in the \(O(6)\) limit are given by [18]:

\[
E(\sigma, \tau, L) = A(N - \sigma)(N + \sigma + 4) +
\]

\[
+ B\tau(\tau + 3) + C L(L + 1),
\]

(9)

where \((A = a_0/4, B = a_3/2, C = a_1 - a_3/10)\), \(N\) is the number of bosons \(\sigma = N, N - 2, N - 4, ..., 0\) and
Fig. 1. (Color Online) Comparison the IBM-1 calculations with the available experimental data [22-24] for 120−126Xe nuclei

Table 1. Adopted values of the parameters used in the IBM-1 calculations. All parameters are given in MeV, except $N$ and CHI (CHI is a constant dependent on the dynamical symmetry)

<table>
<thead>
<tr>
<th>Isotope</th>
<th>$N$</th>
<th>$\varepsilon$</th>
<th>$a_0$</th>
<th>$a_1$</th>
<th>$a_2$</th>
<th>$a_3$</th>
<th>$a_4$</th>
<th>CHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{120}$Xe</td>
<td>10</td>
<td>0.0000</td>
<td>0.082609</td>
<td>0.012133</td>
<td>0.0000</td>
<td>0.178435</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$^{122}$Xe</td>
<td>9</td>
<td>0.0000</td>
<td>0.114918</td>
<td>0.015834</td>
<td>0.0000</td>
<td>0.168768</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$^{124}$Xe</td>
<td>8</td>
<td>0.0000</td>
<td>0.14099</td>
<td>0.019322</td>
<td>0.0000</td>
<td>0.170068</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$^{126}$Xe</td>
<td>7</td>
<td>0.0000</td>
<td>0.164235</td>
<td>0.022538</td>
<td>0.0000</td>
<td>0.181002</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

$\tau = 0, 1, \ldots, \sigma$. $L$ takes on the $L = 2\lambda, 2\lambda - 2, \ldots, \lambda + 1, \lambda$, where $\lambda$ is a positive integer; $\lambda = \tau - 3\nu_\Delta$ for $\nu_\Delta = 0, 1, 2, \ldots$ [20].

3. Results and Discussion

The calculated results can be discussed separately for the energy levels, reduced probability of $E2$ transitions, and potential energy surfaces.

3.1. Energy Levels

The energy levels of some even $^{120-126}$Xe isotopes have been calculated, by using the experimental energy ratios $E2:E4:E6:E8 = 1:2.5:4.5:7$ [21] within the framework of IBM-1. It has been found that the $^{120-126}$Xe isotopes are deformed nuclei, and they have a dynamical symmetry $O(6)$. For the analysis of excitation energies of xenon isotopes, it is tried to keep a minimum number of free parameters in the Hamiltonian. The adopted Hamiltonian is expressing as [20]

$$\hat{H} = a_0 \hat{P} \cdot \hat{P} + a_1 \hat{L} \cdot \hat{L} + a_3 \hat{T}_3 \cdot \hat{T}_3.$$  (10)

In IBM-1, the even $^{120-126}$Xe isotopes ($Z = 54$) have a number of proton boson particles equal to 2, and a number of neutron boson holes varies from 5 to 8, respectively. The Table 1 shows that the parameters used in the present work. The calculated ground $g$-band, $\beta$-band, and $\gamma$-band and the experimental data on low-lying states are plotted in Figs. 1 and 2 for even-even $^{120-126}$Xe isotopes. These figures show that the IBM calculations of the energies, spin, and parity are in good agreement with the experimental values [22–26]. However, it is deviated in the high-spin energies of the experimental data. Levels with ‘( )’ correspond to the cases, for which the spin and/or parity of the corresponding states are not well established experimentally.

Furthermore, from Fig. 1, the levels $5_1^+, 8_2^+, 10_2^+, 2_3^+, 4_3^+, \text{ and } 6_3^+$ with energies of 2.326, 2.996, 3.850,
Calculation of Energy Levels, Transition Probabilities, and Potential Energy Surfaces

Fig. 2. (Color Online) Comparison the IBM-1 calculations with the available experimental data [22, 25, 26] for $^{124-126}$Xe nuclei

Table 2. $\beta_2$-bands for Xe isotopes (in MeV). The experimental data are taken from [22–26]

<table>
<thead>
<tr>
<th>$J^\pi$</th>
<th>$^{120}$Xe</th>
<th>$^{122}$Xe</th>
<th>$^{124}$Xe</th>
<th>$^{126}$Xe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBM-1</td>
<td>exp.</td>
<td>IBM-1</td>
<td>exp.</td>
</tr>
<tr>
<td>$0^+$</td>
<td>1.6051</td>
<td>1.62925</td>
<td>1.5210</td>
<td>2.26444*</td>
</tr>
<tr>
<td>$2^+$</td>
<td>1.9746</td>
<td>1.92111*</td>
<td>2.3597</td>
<td>2.3341</td>
</tr>
<tr>
<td>$4^+$</td>
<td>2.4000</td>
<td>2.44842*</td>
<td>2.6500</td>
<td>–</td>
</tr>
<tr>
<td>$10^+$</td>
<td>5.0987</td>
<td>–</td>
<td>5.9575</td>
<td>–</td>
</tr>
</tbody>
</table>

1.231, 1.688, and 2.275 MeV, respectively, for $^{120}$Xe isotope, and $^{121}_1^+, 141_1^+, 23_2^+, 35_1^+, 42_1^+, 51_1^+, 62_1^+, 142_1^+, 91_1^+, 102_1^+$ with energies of 4.3992, 5.6945, 0.8387, 1.084, 1.850, 2.3345, 2.3219, 3.3212, 3.3044, 4.4685, and 4.4145 MeV, respectively, for $^{122}$Xe isotope correspond to the cases, for which the spin and/or parity of the corresponding states are not well established experimentally [22–24]. From Fig. 2, the levels $^{123}_1^+, 143_1^+, 93_1^+, 103_2^+, 43_2^+, 53_2^+, 63_2^+$ with energies of 4.9488, 6.4330, 4.7970, 4.8430, 2.1650, 2.8956, and 3.8146 MeV for $^{124}$Xe isotope, and $81^+_1$, $91^+_1$, and $61^+_2$ with energies of 3.9404, 5.2875, and 3.1295 MeV for $^{126}$Xe isotope correspond to the cases, for which the spin and/or parity of the corresponding states are not well established experimentally [22, 25, 26]. The $\beta_2$-bands calculated in this work are shown in Table 2. This table presents the comparison between of the IBM-1 calculations and the experimental energy levels of $^{120-126}$Xe isotopes. From this comparison, a good agreement between the experimental data and the IBM-1 calculation is seen. Levels with * correspond to cases, for which the spin and/or parity of the corresponding states are not well established experimentally.

3.2. The $B(E2)$ Values

New information can be founded, by studying the reduced transition probabilities $B(E2)$. The reduced matrix elements of the $E2$ operator have the form [18, 27, 28]

$$\hat{T}(E2) = \alpha_2 [d^l 3 \hat{s} + s^l 3 \hat{d}]^{(2)} + \beta_2 [d^l 3 \hat{d}]^{(2)} = \\
\alpha_2 (d^l 3 \hat{s} + s^l 3 \hat{d})^{(2)} + \chi [d^l 3 \hat{d}]^{(2)} = e_B \hat{Q},$$

(11)
where \(\alpha_2\) and \(\beta_2\) are two parameters, \(\beta_2 = \chi \alpha_2\), \(\alpha_2 = e_B\), where \(e_B\) is the effective charge, and
\[
\hat{Q} = (d^\dagger \hat{s} + s^\dagger \hat{d}) + \chi [d^\dagger \hat{d}]^{(2)}, \tag{12}
\]
where \(\hat{Q}\) is the quadrupole operator. The electric transition probabilities \(B(E2)\) are defined in terms of reduced matrix elements as \([18, 30]\)
\[
B((\varepsilon 2), J_i \rightarrow J_f) = \frac{1}{2J_i} |\langle J_f \mid T(E2) \mid J_i \rangle|^{2}. \tag{13}
\]
The expectation value of the IBM-1 Hamiltonian with the coherent state \(|N, \beta, \gamma\rangle\) is used to construct the IBM energy surface \([19, 20]\). The state is a product of boson creation operators,
\[
(b^\dagger_i), \quad \text{with} \quad |N, \beta, \gamma\rangle = \frac{1}{\sqrt{N!}} (b^\dagger N)^{0}\rangle, \tag{15}
\]
\[
b^\dagger_i = (1 + \beta^2)^{-1/2} \left[ s^\dagger + \beta \cos \gamma (d^\dagger_0) + \sqrt{1/2} \sin \gamma (d^\dagger_2 + d^\dagger_{-2}) \right]. \tag{16}
\]
The energy surface, as a function of \(\beta\) and \(\gamma\), has been given by \([18]\)
\[
E(N, \beta, \gamma) = \frac{N e_d}{(1 + \beta^2)^{1/2}} + \frac{N(N + 1)(1 + \beta^2)^{1/2}}{(1 + \beta^2)^{1/2}} \times \left( \alpha_1 \beta^4 + \alpha_2 \beta^3 \cos 3\gamma + \alpha_3 \beta^2 + \alpha_4 \right), \tag{17}
\]
where the \(\alpha_i\) are related to the coefficients \(C_L, \nu_2, \nu_0, u_2, \) and \(u_0\) of Eq (1), and \(\beta\) is a measure of the total deformation of a nucleus. For \(\beta = 0\), the shape

### Table 3. Effective charge used to reproduce \(B(E2)\) values for \(^{120-126}\text{Xe}\) Nuclei

<table>
<thead>
<tr>
<th>(A)</th>
<th>(N)</th>
<th>(e_B) (eb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(^{120}\text{Xe})</td>
<td>10</td>
<td>0.1112</td>
</tr>
<tr>
<td>(^{122}\text{Xe})</td>
<td>9</td>
<td>0.1094</td>
</tr>
<tr>
<td>(^{124}\text{Xe})</td>
<td>8</td>
<td>0.10</td>
</tr>
<tr>
<td>(^{126}\text{Xe})</td>
<td>7</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**3.3. Potential energy surface \(E(N, \beta, \gamma)\)**

The potential energy surface gives a final shape to the nucleus that corresponds to the Hamiltonian \([31]\) in the equation \([20]\)
\[
E(M, \beta, \gamma) = \langle N, \beta, \gamma | H | N, \beta, \gamma \rangle / \langle N, \beta, \gamma | N, \beta, \gamma \rangle. \tag{14}
\]
The expectation value of the IBM-1 Hamiltonian with the coherent state \(|N, \beta, \gamma\rangle\) is used to construct the IBM energy surface \([19, 20]\). The state is a product of boson creation operators,
The energy levels (positive parity), reduced probabilities, and potential energy surfaces are shown in Table 4 for the 120–126Xe nuclei in the framework of the interacting boson model-1. The predicted low-lying levels (energies, spins, and parities) and the reduced probabilities of E2 transitions are reasonably consistent with the experimental data. For the even 120–126Xe isotopes, the potential energy surfaces show that all nuclei are deformed and are characterized by the dynamical symmetry O(6).

We thank University of Kufa, Faculty of Education for Girls, Department of Physics and University of Kerbala, College of Science, Department of Physics for supporting this work.


### Table 4. B(E2) values for 120–126Xe nuclei (in e²b²)

<table>
<thead>
<tr>
<th>J_i → J_f</th>
<th>120Xe [22, 23]</th>
<th>122Xe [22, 24]</th>
<th>124Xe</th>
<th>126Xe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBM-1</td>
<td>exp.</td>
<td>IBM-1</td>
<td>exp.</td>
</tr>
<tr>
<td>2⁺ → 0⁺</td>
<td>0.3460</td>
<td>0.346(22)</td>
<td>0.2800</td>
<td>0.280(12)</td>
</tr>
<tr>
<td>2⁺ → 0⁺</td>
<td>0.0483</td>
<td>–</td>
<td>0.0392</td>
<td>–</td>
</tr>
<tr>
<td>2⁺ → 2⁺</td>
<td>0.4766</td>
<td>–</td>
<td>0.3829</td>
<td>–</td>
</tr>
<tr>
<td>4⁺ → 2⁺</td>
<td>0.4766</td>
<td>0.412(28)</td>
<td>0.3829</td>
<td>0.409(22)</td>
</tr>
<tr>
<td>4⁺ → 2⁺</td>
<td>0.0385</td>
<td>–</td>
<td>0.0307</td>
<td>–</td>
</tr>
<tr>
<td>6⁺ → 4⁺</td>
<td>0.5272</td>
<td>0.415(63)</td>
<td>0.4188</td>
<td>0.396(144)</td>
</tr>
<tr>
<td>6⁺ → 4⁺</td>
<td>0.0295</td>
<td>–</td>
<td>0.228</td>
<td>–</td>
</tr>
<tr>
<td>6⁺ → 2⁺</td>
<td>0.0245</td>
<td>–</td>
<td>0.0211</td>
<td>–</td>
</tr>
<tr>
<td>8⁺ → 6⁺</td>
<td>0.5347</td>
<td>0.341(59)</td>
<td>0.4177</td>
<td>0.288(179)</td>
</tr>
<tr>
<td>8⁺ → 6⁺</td>
<td>0.0289</td>
<td>–</td>
<td>0.0225</td>
<td>–</td>
</tr>
<tr>
<td>10⁺ → 8⁺</td>
<td>0.5133</td>
<td>0.324(53)</td>
<td>0.3912</td>
<td>0.432(179)</td>
</tr>
<tr>
<td>10⁺ → 2⁺</td>
<td>0.0046</td>
<td>–</td>
<td>0.0032</td>
<td>–</td>
</tr>
<tr>
<td>12⁺ → 10⁺</td>
<td>0.4695</td>
<td>0.292(46)</td>
<td>0.3446</td>
<td>–</td>
</tr>
<tr>
<td>12⁺ → 10⁺</td>
<td>0.3042</td>
<td>0.246(240)</td>
<td>0.1532</td>
<td>–</td>
</tr>
<tr>
<td>14⁺ → 12⁺</td>
<td>0.3770</td>
<td>0.282(42)</td>
<td>0.2809</td>
<td>–</td>
</tr>
<tr>
<td>16⁺ → 14⁺</td>
<td>0.3718</td>
<td>0.43(14)</td>
<td>0.2015</td>
<td>–</td>
</tr>
<tr>
<td>16⁺ → 16⁺</td>
<td>0.2330</td>
<td>0.598(105)</td>
<td>0.1077</td>
<td>–</td>
</tr>
</tbody>
</table>

4. Conclusions

The energy levels (positive parity), reduced probabilities of E2 transitions, and potential energy surfaces for 120–126Xe nuclei have been calculated within the framework of the interacting boson model-1. The predicted low-lying levels (energies, spins, and parities) and the reduced probabilities of E2 transitions are reasonably consistent with the experimental data. For the even 120–126Xe isotopes, the potential energy surfaces show that all nuclei are deformed and are characterized by the dynamical symmetry O(6).
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РОЗРАХУНОК РІВНІВ ЕНЕРГІЇ, ІМОВІРНОСТІ ПЕРЕХОДУ, ПОВЕРХОНЬ ПОТЕНЦІАЛЬНОЇ ЕНЕРГІЇ ДЛЯ ПАРНО-ПАРНИХ $^{120-128}$Xe ІЗОТОПІВ

Резюме
У моделі взаємодійчих болів розраховано рівні енергії, ймовірності переходів $B(E2)$ і поверхні потенціальної енергії деяких парних $^{120-126}$Xe ізотопів у хорошій відповідності до експериментальних даних. Поверхня потенціальної енергії як одна з характеристик ядра визначає кінцеву форму ядра. Контурий графік поверхонь потенціальної енергії показує, що $^{120-126}$Xe ядра деформовані і нестабільні до $\gamma$-розпадів.